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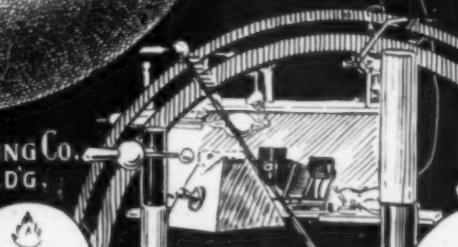
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THE AMERICAN

X-RAY JOURNAL

A MONTHLY
DEVOTED
TO THE
PRACTICAL
APPLICATION
OF THE
NEW SCIENCE
AND TO THE
PHYSICAL
IMPROVEMENT
OF MAN.

AMERICAN X-RAY PUBLISHING CO.
INSURANCE EXCHANGE BLDG.
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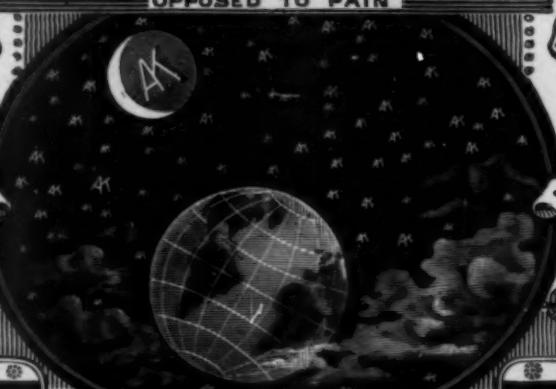
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ST. LOUIS, MAY, 1898.

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CONSUMPTION of the lungs is the cause of nearly two-sevenths of all deaths due to disease. If consumption could be prevented the average life of the civilized races would be extended to beyond 48 years. The stamping out of any one other disease would make but little comparative change in the relative life of the human race, unless we should rate old age and drunkenness. When cholera suddenly sweeps over a country, mankind stands aghast and the wheels of society are profoundly disturbed, and yet the mortality over a large area of country from an epidemic was never known to equal the ever prevailing mortality of consumption. So undisturbed has mankind settled down to the seem-

ingly inevitable that fear of such a disease scarcely more agitates the mind than the thought of old age. There is another aspect to this question that deserves the gravest consideration. I refer to the impoverishment consumption inflicts upon a community and a nation. The average worth of man in the United States is about \$1,000.00. Since consumptives are carried away as a rule at the prime of life, the loss is immeasurably greater for this particular disease.

Up to within a few years ago consumption was considered an incurable disease; but within recent times cures are not uncommon. These results have been brought about by the improvements in our knowledge of the local conditions and in the means of treatment. But the greatest difficulty is in making a proper diagnosis in the early stages of this disease. The writer firmly believes that the mortality can be reduced to one-half or less by the means we now employ if used before cavities have formed or extensive lung infiltration has occurred.

It is impossible to make a positive diagnosis of pulmonary phthisis at all times in its incipiency. In fact considerable impairment of the lung may exist without physical signs to warrant a diagnosis. The changes sometimes go on for a long time with increasing infiltration of the lung without a noticeable change in its sonority or modification of the vascular murmur.

Laryngeal symptoms often obscure these signs of early disease. The most skilled diagnosticians fail in these cases when they rely upon auscultation and percussion.

The need of a more satisfactory method for diagnosing pulmonary tuberculosis has been seriously felt. The introduction of the x-rays as a diagnostic agent has widened our knowledge in this direction to the point at least that early infiltrations can be detected in the lungs when no known physical signs could. This has been proven time and again. Even where cavities have existed and could not be detected by the usual methods they were pointed out unerringly by the Roentgen light. Probably the most exhaustive study in this line has been made by Dr. J. Edward Stubert, of Liberty, N. Y. Others have confirmed his observations. In the doctor's reprint from the *Yale Medical Journal* he recapitulates as follows:

The results of investigations made by Dr. Stubert at the Loomis Sanitarium, by Williams, of Boston, and others prove that:

1. The fluoroscope is an accurate agent for corroborating and extending diagnosis made by the ordinary methods.

2. It is capable of demonstrating foci of tubercular infection earlier than they can be distinguished by the ear.

3. It shows either uni- or bilateral enlargement of the heart and all displacements of that organ.

4. Emphysema, asthma, pleurisy, hydro-pneumo-thorax, pyo-pneumo-thorax, hydro-thorax and pneumonia, are all easily recognized and their limits demonstrated. In the last-named disease it has been claimed that a more certain prognosis may be assured by the use of the fluoroscope.

5. Thoracic aneurisms are recognizable in their early stages.

A summary of the diagnostic signs are as follows:

1. Slight haziness indicates the beginning of tuberculous infiltration and may or may not be accompanied by dullness.

2. Decided shadows indicate consolidation, the extent of which is in direct relation to the comparative density of the shadow thrown on the fluoroscope.

3. Circumscribed spots of bright reflex, surrounded by narrow dark shadow rings, or located in the midst of an area of dense shadow, indicate cavities.

4. Intense darkness, especially at the lower part of the lung, indicates old pleuritic thickenings over consolidated lung tissue.

5. Pleural effusions are shown in black shadow the upper level of which may be agitated by succession.

6. There is no reason to doubt that the effusion of pericarditis would throw a like shadow which would be distinguishable from the heart shadow above by its greater blackness.

7. Shadows thrown in the first and third stages of pneumonia probably resemble those of tubercular infiltration. The shadow of the second stage of pneumonia is identical with that of tubercular consolidation.

8. In emphysema and asthma the reflex is abnormally clear and the movement of the diaphragm is restricted.

A great deal depends upon the intensity and steadiness of light and the amount of muscular and adipose tissue intervening between it and the fluoroscope. At Loomis Sanitarium an eight-inch spark coil has been found most satisfactory. The motor generation gives a steadier light than a vibrator, and the flickering of the latter is very trying to the eyes and confusing as to the relative intensity of shadows.

Considerable practice is necessary before the eye can appreciate perfectly the fine differences of shade and outline.

Examinations in this line are not confined to this country, and I do not know that we can make just claim to priority in the use of this aid to diagnosis. The French have from an early date used the x-rays as an assistant in the study of thoracic disease. The outcome of this research was a confirmation of the x-rays as a diagnostic agent for confirming or disproving incipient phthisis. The German physicians are making more universal use of the x-rays than any other nationality. It is to be expected that they would since it was their discovery. The English use of the x-rays is about in line with the practice of this country.

Ever since the introduction of the chemical test of urine for the fairly accurate diagnosis of kidney disease, a standing request has been

made by the medical profession to the public to have the kidney's excretions analyzed at repeated intervals throughout life. This would give an opportunity to detect a serious disease in its earliest attack, and at the time it might be cured. The diseases of the kidneys are infinitely less numerous than those of the lungs when mortality is considered. The means now offered for detecting lung involvement at the earliest period, is accurate and safe, but entails some considerable expense and study of technic, but its relative importance outweighs all difficulties. No generating apparatus for the productions of x-rays should be employed that require noticeable time for the light to cast shadows through the body, and the position of the patient should never be nearer than six inches from the tube. The light should be as steady as an incandescent lamp. The fluoroscopic screen should be made of the finest fluorescent crystals. With an outfit of this kind it is possible for every physician to detect consumption, the greatest enemy of the human race, before the ravages of disease have destroyed the hope of repair. As physicians, it is our duty to encourage x-ray examinations of a wide class of suspects with the view of lessening the progress of this disease. Especially should this encouragement be given to all persons with a hereditary dyscrasia, those who are induced to cough from slight changes in the temperature and humidity of the weather, and the catarrhal class. It is well known that caseous phthisis following catarrhal pneumonia is often rapidly fatal, but if prolonged to a period of chronicity can be cured. The particular form of chronic caseous consumption is so gradual in its onset that the early symptoms evade all hitherto known methods for diagnosing the disease. The x-rays will early reveal that which it was formerly impossible to know. When the pre-tendency to tuberculosis has

come by way of inheritance, every symptom of ill health not accounted for, until the patient has arrived at 40 years of age, should be examined with the x-rays. That so-called fibroid phthisis, although the most chronic form of the disease, is the most amenable to treatment in its earliest attack and the most rebellious when arrived at an advanced stage.

There is no region of the earth equal to the United States for adaptability of climate, and no nation of the earth equally prepared to lend assistance to this class of unfortunates. The efforts shown already by the medical profession to take advantage of the x-rays for purposes of early diagnosis of phthisis pulmonalis, is a guarantee of less suffering with this particular disease and an assurance that there is a lease to be given to the average longevity of man.

A NEW machine has just been made for generating x-rays which weighs only 25 pounds and is about the size of a Webster's unabridged dictionary. This apparatus, according to the *Electrical World*, will send enough rays through the body to illuminate the fluoroscope. The machine was gotten up for the Cuban war and is the invention of Prof. R. A. Fessenden, of the Western University of Pennsylvania.

The importance of the x-rays as an assistant in military surgery is recognized by the Surgeon General who has ordered the several divisions of the army to be equipped with the machines. We are a little behind in this matter, for every first-class nation have long since provided themselves with this machine as one of the necessary adjuncts of the army.

The small apparatus above mentioned is worked with a dynamo which may be driven by a gasoline motor or a gas turbine.

X-ray machines of low generating capacity are of little use, very disappoint-

ing if not actually harmful. The inferior light causes the operator to approach the tube for greater radiance. It is here where the electricity is passing and human tissue brought into the electrical field and exposed for any considerable time will likely suffer alteration. This effect is what has been called x-ray burns, although the x-rays played no part in the pathological change. A poor x-ray apparatus is not to be relied upon. The distortion of shadows are observed which may pervert the true diagnosis. Failures of this kind have a tendency to bring discredit upon the most useful discovery of the century. Articles in journals have recently appeared in which the experiments related clearly indicate the inefficiency of the apparatus used. For army service there should be nothing used short of the best. Radiance incapable of revealing a good view of the hip joint at twelve inches is an unsafe and unreliable light for other regions of the body.

Mr. Lynde Bradley, of Milwaukee, according to the *Pittsburg Dispatch*, has been employed by the Government to assist in equipping the army with x-ray machines. Mr. Bradley has invented a carriage for the safe conveyance of the machine in the field and a separate conveyance on wheels for the engine, boiler and dynamo. For field use the spark will be about 12 inches and for hospital and for the navy from 12 to 20 inches. These machines cost about \$700 each, but great saving of life and deformity will amply repay the Government. The Spanish authorities have ordered x-ray machines from a manufacturer of this country. It is argued that it would be patriotic to fill the order, since the use of the machine for our captured wounded would be in their hands a commensurate blessing.

In the February issue of THE AMERICAN X-RAY JOURNAL we reproduced two

radiographs one each of an adult man and woman both of whom were fully dressed at the time the picture was taken. In one, the clothing was very indistinct and mostly invisible, while in the other the clothing showed remarkably clear. The particular reason for this phenomenon elicited inquiry from many sources.

We therefore offered the following. The American X-Ray Publishing Co. offers a premium of \$10 for the most instructive article explaining the reasons for the difference in appearance of the two radiographs.

The award was promised in May on the day of going to press with this issue.

The committee after carefully reviewing the manuscripts of the several contestants have given the premium to Walter W. Johnson, M.D., of Pittsford, Monroe Co., N. Y.

RADIOSTEREOSCOPY.—Hedley. *Lond. Elec. Eng.*, March 11. *The Elect. World*.—A brief abstract from the London *Lancet*, in which he gives a formula for the lateral displacement which should be given to an x-ray tube when taking two negatives for use with the stereoscope, when the distance of the object and its thickness are known. The formula is that the relative displacement of the tube and object is equal to the distance of the tube from the object plus the thickness of the object, then multiplied by the former distance and divided by fifty times the thickness of the object. When the displacement is equal to the distance apart of the eyes, say 6.6 cm., the virtual image appears at the distance that the object has been photographed from, and is the proper size. Therefore, when practicable, the displacement should be 6.6 cm.; when this is known, as also the thickness of the object, the same formula can be used to calculate the distance of the object from the tube. He has verified the accuracy of the method experimentally.

TWO RADIOPHOTOGRAPHS.

The radiograph, No. 1, in the February number of *The American X-Ray Journal* was made entire, I believe, on a celluloid film.

The tube was placed four and one-half feet above the subject and the exposure, I have seen stated, as one-half hour and in one journal as one hour.

The composite radiograph No. 2, on the opposite page, is much superior in sharpness and definition.

In analyzing the difference between the two radiographs it is necessary to have some understanding of the photographic film and the action of light and certain chemicals on the same.

The film is composed of an emulsion of gelatine and chemicals of which the bromide and iodide of silver make it sensitive to light.

Light in some manner affects the silver salts so that various chemical solutions called "developers", oxidize or bleach the film in proportion to the amount of light striking any portion, from the faintest gray to a jet black.

If a fresh, unexposed plate be placed in a developer, not too strong, no change will take place; but if any portion of the plate be exposed, even the shortest time to active light and then placed in the developer, the exposed portion will quickly begin to darken, while the unexposed portion will remain light.

The amateur photographer eagerly makes his preparation for developing his first negative—a landscape, let us say. He gently lays the exposed plate in the tray, pours the developer over the film and slowly rocks the tray. The fluid swashes back and forth across the face of the plate a few times and all at once the anxious watcher sees a change come over the film. He sees the tops of the trees and roofs of houses like white silhouettes against a dark background. He sees that this dark background is the

sky portion of his negative. He no sooner discovers this than he notices that he is getting those beautiful fleecy clouds he admired so much. There they are, mass on mass, as sharp and clear as anything he ever saw.

He pats himself on the back. This is a triumph. No amateur of his acquaintance gets such beautiful clouds in their picture and here at his first attempt is a gem.

But hardly does the foreground, the trees, buildings and figures begin to show any detail before the beautiful clouds begin to grow dim and sink into the general blackness of the sky portion and when the negative appears properly developed they have entirely disappeared. To be sure, he can see them faintly through the finished negative; but they do not appear in the print and he learns that so far as the clouds are concerned his plate has been exposed much too long. His picture may be fine but the clouds will not appear.

The x-rays or Roentgen rays act on the photographic film similar to light, blackening it in proportion to the amount of rays striking the film.

Any object, cutting off all rays from the film, leaves that portion unaffected.

When nothing interposes, the film is affected most and between these two points, the affected and unaffected, we have every shade of gradation.

Radiograph No. 1, is like the first negative of the amateur photographer. The clothing of the subject is like the fleecy clouds. The negative was very much overexposed so far as the clothing was concerned and though it can probably be seen when looking through the negative, it disappears in the reproduction the same as the cloud from the print.

It will be noticed that the pelvis in No. 1, is very well shown. This portion of the body demands a longer time for a good radiograph than any other and the ratio of difference is so great that

not only the clothing but even the flesh of the hands and all muscular detail are lost.

Radiograph No. 2, is a composite, that is made up from a number of smaller plates. The distance of tube from plate and time of exposure varied according to the size and thickness of the parts taken. The result was that no part was overexposed and the thinner portions of the anatomy and the clothing did not suffer in the development and reproduction.

The length of exposure has much to do with the resulting sharpness of outline. An overexposure produces a "fuzziness" which, in ordinary photography, would be called "out of focus."

Compare the nails and eyelets in the shoes of No. 1, with those of No. 2 and you will see what I mean.

The negatives of such radiographs as No. 2, seem to show the very texture of the bones and one can hardly realize that the outline of the several parts appears in a single plane.

In ordinary photography there have been several kinds of special plates made to overcome the trouble of photographing very light and dark objects on the same plate without overexposing the one and underexposing the other. The "non-halation", or multiple coated plates are used for interiors where there are windows and most violent contrasts. It has never been my privilege to work these plates, but I would suggest that they seem to me peculiarly adapted to x-ray work where some part is very much overexposed in order to give another portion proper time. The isochromatic and orthochromatic plates are used in photographing colors, paintings, landscapes, &c.

With these plates the clouds are most beautifully shown in the landscapes and as they are more sensitive to the red end of the spectrum they might be found in

some respects superior to the ordinary plate in x-ray work.

As St. Louis is the headquarters of several of the largest plate manufacturers, would it not be a good thing for the editor of *The American X-Ray Journal* to give us a report of the efficacy of these special plates compared with the ordinary?

WALTER W. JOHNSON, M. D.
Pittsford, Monroe Co., N. Y.

DISTORTION MEASUREMENTS IN SKIAGRAPHY. Schmidt and Fuchs. *West. Elec.*, March 26.—A short article on the distortions of the shadows, which it is claimed are well known to all experimenters with x-rays; they give the results of experiments "to determine the limits of this variation for practical purposes" (but what variation is meant is not clear); these limits are said to give appropriate information on the distortion when the distance on the tube and the thickness of the object are known; they also speak of a focus point and focus line, the meaning of which is not quite clear. They found that the distortion is directly as the distance of the object from the focus line, and directly as the distance from the focus plate; the results are given graphically and enable the distortion to be found for different conditions.

RECENT APPLICATIONS OF RADIOPHOTOGRAPHY. Goodspeed. *Eng. Eng.* March 24.—*The Electrical World*, N. Y.—A brief abstract of a recent Franklin Institute lecture; the abstract contains very little information. Regarding the nature of x-rays, he states that at present the consensus of the best opinion is that these rays are produced by transverse vibrations in the ether, similar in nature to ordinary light, but of a vastly greater frequency; a quotation from the opinion of Stokes is given.

SKIAGRAPHY.

BY DR. OTTO L. SCHMIDT, OF CHICAGO, ILLS.

(Kindly furnished for reproduction in THE AMERICAN X-RAY JOURNAL.)

Fig. 1 represents a skiagraph of a patient referred to Dr. Schmidt by Dr. F.

There was a large dull area over the upper part of the sternum and to its right; this was pulsating, but did not project. There was a systolic bruit, different pulses, and cardiac hypertrophy. The skiagraph was taken by placing the sensitized plate on the chest with the dis-



FIG. 1.

W. Rohr, to whom indebtedness was acknowledged for permission to print it. The patient was fifty years old, presented the typical signs of aortic aneurism.

charge tube behind the patient. The time of exposure was seven minutes. The picture shows the inner ends of the clavicles, the sternum, the diaphragm

and upper border of the liver. The triangular shadow of the heart occupies a space lower than in normal skiagrams of this region. The large round shadow taking up the greater part of the centre

ward of the aneurism, on the left side of the vertebral column.

About one month after the skiagram was taken the patient died. The post-mortem examination by Dr. H. E. San-

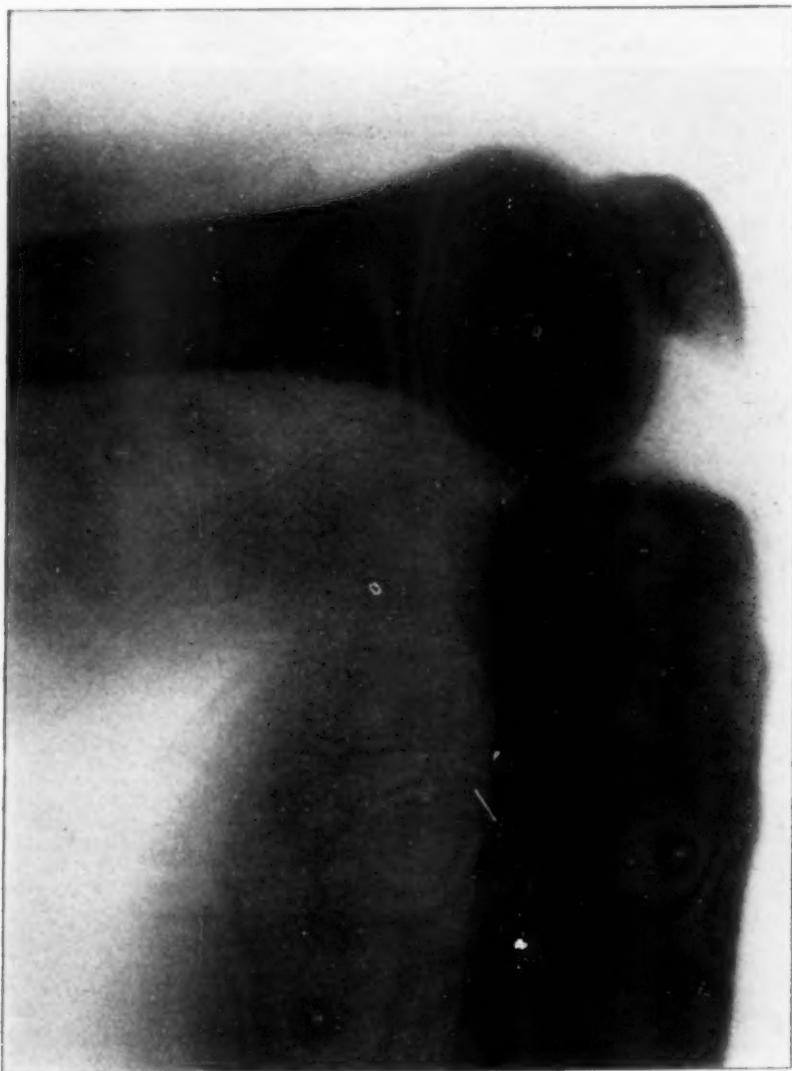


FIG. 2.

of the picture is the aneurism, which in the picture is larger on the right side. Another picture where the plate was on the back showed an extension down-

er showed the aneurism almost the same size as shown in the picture. It was sacculated and formed of the transverse portion of the aorta. In addition there



FIG. 3.

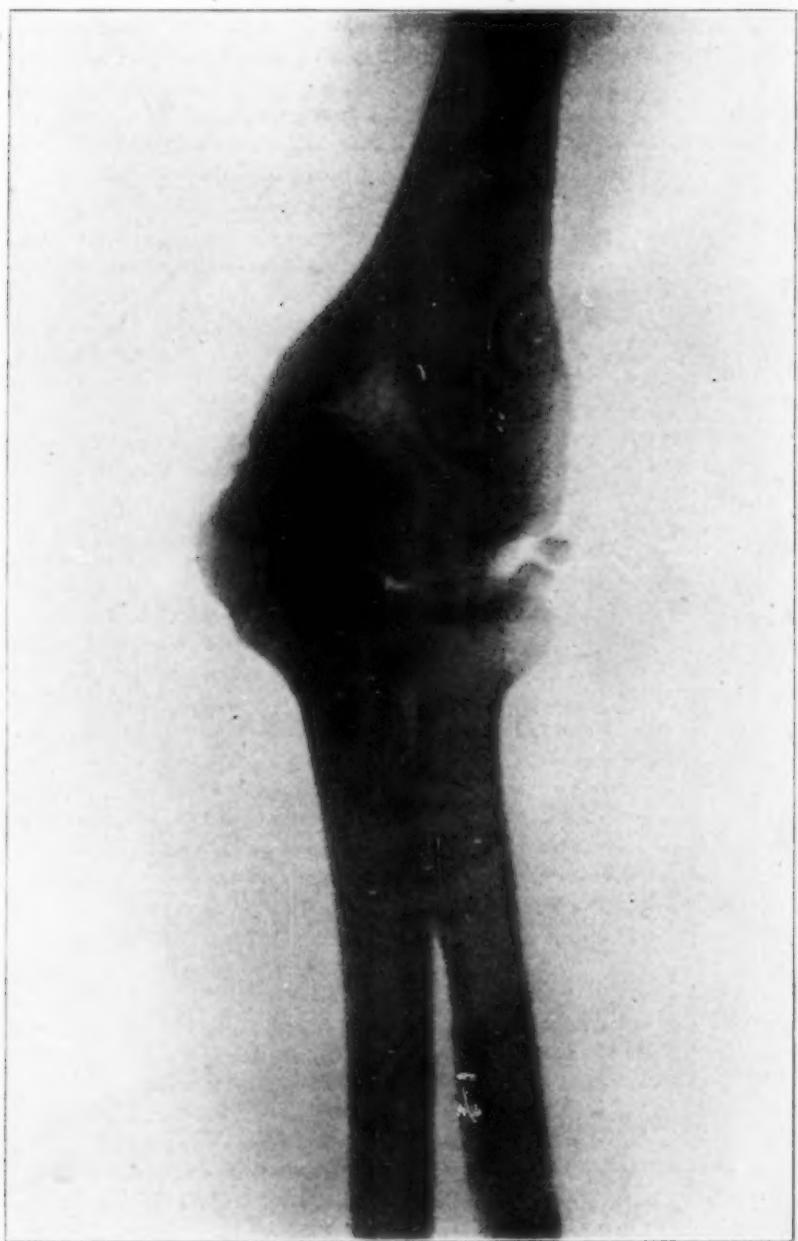


FIG. 4.

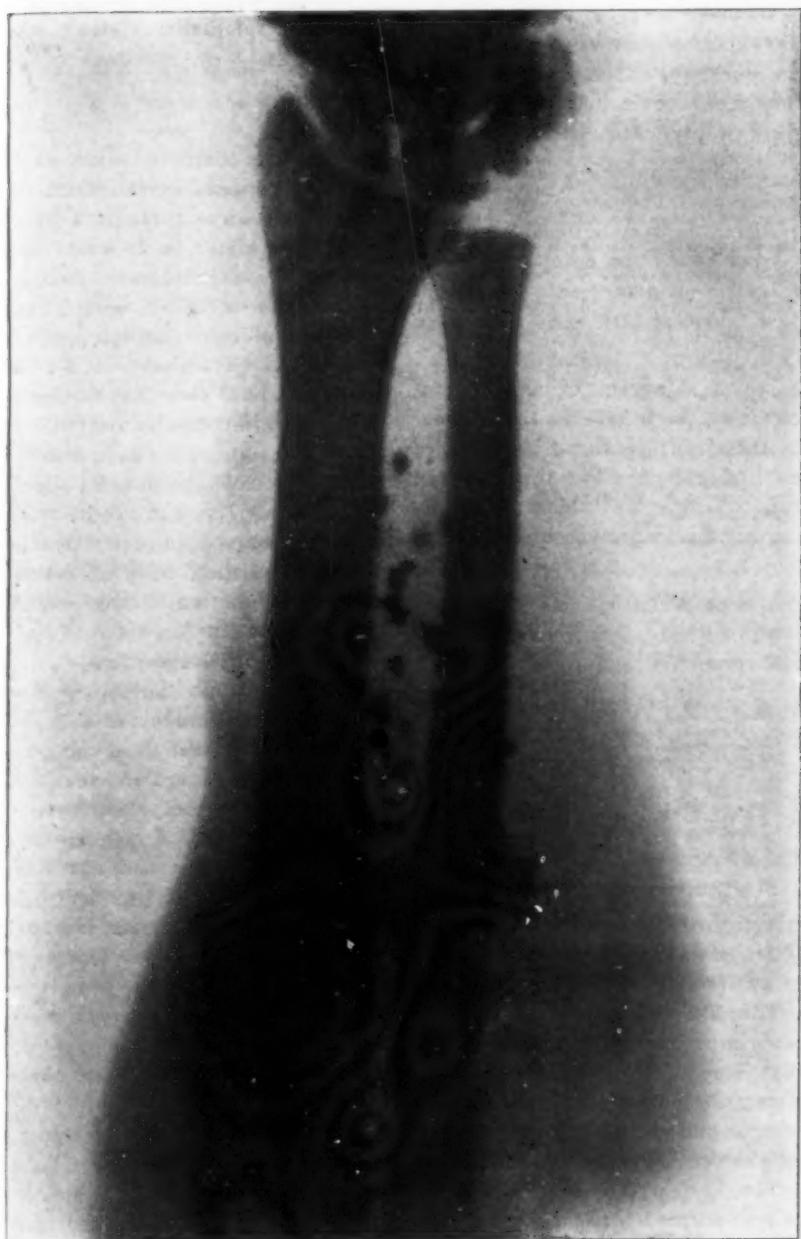


FIG. 5.

was a smaller cylindrical tumor on the descending aorta, which was indicated in the second skiagraph. The accompanying skiagraph shows the size of the tumor accurately, as the sensitized plate was very close to it and the Crookes' tube only twenty inches away.

Fig. 2 shows a normal knee in flexion at 90 degrees. The large knee-cap in this position is very noticeable. This picture was taken for comparison with the skiagraph of a knee that contains a so-called "floating cartilage" not shown in this issue.

Fig. 3 is a skiagram of an old fracture of the elbow joint. In the original picture the dark lines are in course of the brachial artery. Since this has been shown in a number of skiographs it is without question a picture of the artery itself.

Fig. 4 represents the same elbow joint as shown in Fig. 3, but from a different point of view.

Fig. 5 shows 26 shot in the forearm but in the negative 40 shot are plainly seen. The half tone does not reproduce all there is in a negative, the latter, of course, is therefore the more valuable for the surgeon.

EXISTENCE OF ROENTGEN RAYS IN CATHODE RAYS. Roiti. *Acc. Lincei*, 6-2, 1897; abstracted in *Science Abstracts*, Jan. *The Electrical World*, N. Y. He describes experiments confirming the result that Roentgen radiation is due to transformation of cathode rays and not to a simple subtraction; there probably do not exist cathode rays which can not be deflected, or if they exist, they can not be transformed into Roentgen rays; eliminating the effects of occluded or adherent gas, it is found that different pure metals emit Roentgen rays under cathode ray impact, which increase regularly with the atomic weight.

Is There a Relationship Existing Between The X-Ray and the Luminating Power that Obtains in Telepathic Vision?

(Concluded from page 217.)

BY J. J. FLY, M. D.

In a former communication, we showed from experimental investigation, that ordinary light force through a process of trajections could be followed from the ordinary to the inordinary; from the visible to the invisible, and when sufficiently reinforced through proper mediums could be utilized in illuminating opaque bodies, that had hitherto been considered impervious to light.

We also sighted the fact, that this finer modification of light, not only appeared or seemed to originate in a more attenuated atmospheric medium, but that it seemed peculiarly adapted to it, and, that it exercised its function in that medium, and did not seem to come within the visual range of normal perception.

It was through the happy thought or accidental interference of the phosphorescent screen, that these more rapid vibrations were coaxed and tempered into a coalition with the slower rate of motion operating in ordinary vision.

It was Crookes, and not Roentgen, who supplied conditions for the x-ray; it was Crookes who made it possible for the accident that fell to Roentgen, yet, Roentgen and Crookes were operating along the lines of the natural forces, and could not help but discover more, as they advanced along hitherto untrodden paths.

It is for one man to note a part of the environments surrounding a thing, and for another to see another, and it is the data that all have discovered, that leads to all legitimate conclusions.

Now, since it has been proven that there is a finer light, whose function does not apply to the ordinary uses of man, and as man is supposed to be a repre-

sentative, or epitome of all the forces of the universe, it is natural to conclude that there is a chord within his nature, that vibrates in unison with every force in the universe around him; that he is an intelligent, conscious, receiving station, acting as a relay for the reinforcement and gradual accumulation of facts pertaining to the laws and principles of all cosmic action.

There is an external and an internal side to every expression of nature, and man forms no exception to the rule. Man has his functions that bring him into relation with the external expressions of nature, and allows him to study them, and become conversant with them; and, he has found that there are deeper lessons to be learned than appears on the surface of things; he has found that he possesses attributes of greater penetrating power that are equal to, and quite as mysterious as the ordinary senses.

The faculty that constitutes this extraordinary sense has been demonstrated the "sixth sense."

It matters not that such a sense has been disputed; it stands to reason from the foregoing argument that it does exist, and thousands of men and women can affirm it from data coming from their own experience.

Every one possesses it; some realize it, while many do not; all could, and many have, while at the same time they did not, or would not recognize it.

It is a property of the subjective mind, and not a function of the objective; it is of the inner, and not of the outer man; it belongs to the immortal and is of the infinite spark that has kindled man's individuality into existence. Therefore, its function is to bring the soul into closer relations with the infinite. It is not bound down by time and space any more than a ray of light from the radiant sun; it is the motor of the soul, or the resultant motion of the vibrating elements of the soul whose nature is attuned

to a soul ether, whose atoms shiver and oscillate at the same rate of motion. It is a thought realm, and the motion of a desire is caught up by the circumambient ether, which flash the thought vibration from pole to pole, or from planet to planet without regard to time, matter or space.

The force by which a thought is transferred, must be an entity, and the medium that carries the thought, becomes itself resolved into a series of motion that may be caught again by the sounding-board of another mind, and by it, be translated like the rays of the telegraph line are made to tell the thoughts of the operator. It may be better illustrated in the words of an able exponent who says: "As a lamp gives light because it is able to set the light ether in motion, giving off waves therein, so the brain gives waves or pulsations in the psychic ether. These waves go outward and form a sphere of the individual as the waves of light around an incandescent body."

There is not only such an aura surrounding every individual, but his every thought takes on the image of the things thought of, and occupies a place in his particular atmosphere.

To make our conception more plain, we will illustrate by giving an example: Two harmonious persons conclude to try an experiment of thought reading.

A, after being blindfolded, takes a seat at one side of a room, while B, lays down an object—a card—a knife, a paper weight, or anything he chooses to think of, and concentrates his mind upon it.

A proceeds to put all thoughts out of his mind and determines to pose in constant expectancy of seeing the picture, or image of the object. B is thinking about what is drawn in detail before him. Sooner or later, A feels himself entering into a quiet, easy state, bordering on to numbness; foggy, vapory looking clouds

come and go before his face, which he appears to see just in the same manner as he would see with his natural eyes, the sensations being the same.

He is now lost to everything except the vapory looking clouds before him, and, while he watches them, they suddenly disappear, and he sees a brilliantly illuminated firmament, which at times is painted with its entire spectra of colors, which commingle and blend into each other in the most beautiful fashion.

While he is watching this beautiful play of colors belonging to this inordinary realm of sight sensation, the atmosphere of diversified colors begin to disappear, and finally they have resolved themselves into a clear screen or background of blue upon which appears a clear and clean cut object—a knife—a card—a person, or animal; it remains for a moment only, and disappears as he finds that he is exerting himself to see it more particularly. He then remembers that passivity and concentration are the conditions that allows a conscious recognition and success in the experiment; consequently he again brings the pulsations of his mind back to that uniformity of motion that beat in sympathy with the motion of the image, and it reappears again: it appears and disappears, under such exact similarity of mental condition that he not only learns that there is a meaning in the occurrence of the special psychics formation, but that a particular state of mind is a necessity which he now realizes more than ever.

Now, if B thinks of a knife, and A sees the image of a knife floating before him; if they try this experiment an innumerable number of times with various objects, and A is universally successful, or successful in a majority of instances in obtaining a mental image of the thought that B concentrates upon, they can come to no other conclusion than that A can really see what is in B's mind.

It matters not, if they are both surprised at the power of B's mind being endowed with the skill of an accomplished artist in painting his thoughts upon this ordinarily invisible firmament, to which A's conscious mind has become attuned; they must admit that it is true. If it were not true, the image would not be there, and, as it is there, it is formed by some intelligent activity; and, as the thought originated in B's mind, he must have been the builder of the image.

Now, if A and B occupy different rooms, and succeed in this experiment in the same manner as before, it signifies that material walls are not an obstruction; if they allow miles of space to intervene, and they still succeed, we conclude that space, and all forms of material obstruction is no barrier against this projected atmosphere bearing the records of every human life.

Again, we will say, that B is miles away, and that A concludes that he wishes to know his whereabouts, &c.

B at this time is not conscious of any attempt on him by A; yet, A quietly settles down, concentrating his mind upon him, and presently sees him, and notes what he is doing. By repeated trials he finds that "coincidence and imagination" will not explain, and he concludes that here is another power added on that is above the ordinary; he carries his experiment further: he wishes to determine the result of a disease, the sex of an unborn child, the result of a political contest, the cause of a "Maine" disaster prior to tangible developments, or any other thing that he is particularly interested in, and he finds at each trial, or nearly so, that a picture or image, showing an action or expression which he afterward verifies by actual discoveries or reports, unerringly comes before him. After this, his faith becomes renewed in the claims of biblical prophecies, and that ancient seers and dream-

ers were not wholly fraudulent and imaginary creatures.

We have mentioned the power that obtains to the individual who has cultivated the deeper faculties belonging to the human mind, to show the similarity of results arising from its use, and that which accrues from the application of the x-ray.

It is true that the x-ray can not, and never will do, what the development of the minor reservoir of the human mind can do. The mind is an intelligent automatic machine, that is furnished with every attribute necessary to an entity endowed with eternal life; the sensation of sight is one of these attributes; that there may be sight, there must be light; light is a force that conduces to transparency; it renders the atmosphere, common glass and many other substances so transparent that the natural eye sees objects through them as though they were not. The same power of light is obstructed in proportion to the degree of opacity found in different material objects. As the power of the light is increased, it has been shown by science that opaque bodies become more and more transparent until they seemingly disappear, and we feel as though they were not.

From these demonstrated truths, the clairvoyant or telepathist finding his supernormal senses making the same impressions upon his mind as his normal senses do, concludes that the light that illuminates the former is only a higher degree, or greater intensity of the force that operates upon the natural organs. This is conclusive from the fact that we can conceive of but one light force, and though there may be many modifications of it, many degrees of illuminating power, yet the same law pervades the entire range of its varied phases.

By means of a Crookes' tube an invisible light has been demonstrated through the interposition of a medium, the screen;

the telepathist brings his own objective nature into a hyper-sensitive condition where it takes the place of the x-ray medium (the screen,) and his deeper so-called subjective being reflects some of the activities of the transcendent light that illuminates the invisible world upon his normal consciousness; and thus, he is enabled to realize a foretaste, through this intuitive process, of some of the activities belonging to a supernal world.

ROENTGEN RAY NOTES. ROLLINS, *Elec. Rev.*, Feb. 16.—In this continuation of his very long serial he states that another reason why the vacuum rises is that the residual oxygen molecules are "smashed" and that the molecules therefore contain more atoms and become less in number, increasing the vacuum; they are then decomposed by heat. He claims that the wave length depends upon the molecular weight of the bombarding molecules and that therefore the gas and metal should be tuned to strike the target with the same velocity; this gives a method of determining the molecular weight. He shows why hydrogen and argon are not suited when the cathode is aluminum; also that bad definition is caused by the dancing of the radiant point.

FLUOROSCOPY OF PLEURITIC EFFUSIONS.—Bergonie and Carriere report that the fluoroscope shows the displacement of the liquid as the patient assumes various positions, and with the motion of the diaphragm. Purulent effusions seem less opaque than the serous. But its principal value consists in the information derived in regard to the condition of the lungs above the effusion. It completes Grancher's schemas, reveals bacillary lesions and has a great prognostic value. In one case the clinical data were at fault owing to adhesions, which prevented the "sou" sound considered by Pitree pathognomonic.—*Seine Med.*, Dec. 15.

X-RADIANCE AND THE LAGGING DOCTOR.

BY FRED O'HARA, M. D., SPRINGFIELD, ILLS.

"Doctor, will you please examine my boy's elbow? He sprained it some time ago and our family physician bandaged it. It does not seem so useful as before." Then the physician, thus addressed, after examining the arm carefully, subjects it to inspection by the light of the x-ray, which apparatus he has in his office. "Madam, your son's arm was not sprained, but broken. See for yourself." And he hands the woman the fluoroscope and the Roentgen ray proves that he tells the truth. Five minutes has sufficed to prove that which never would have been demonstrated without the all powerful x-ray, and the doctor has a new name on his rapidly growing list of patients.

The above is not a fancy drawn picture. It is a fact—happening day after day in our land.

Little more than two years ago, the medical world was startled to hear that a new variety of light had been found; to which light, flesh was transparent. The gray bearded vender of sugar coated specifics shook his head and stroked his beard in a self-complacent manner. The medical scientist awaited with impatience the development of this wonderful machine—for he saw how infinitely valuable it would be to the medical world.

Now, things are changed. Our sugar coated friend lives in constant apprehension that the "new-fangled thing" will show up some of his botched work. The "up-to-date" medical man rejoices in his x-ray apparatus, for it saves him many a fretful hour.

"We are rapidly approaching a point, where the doctor who has not equipped his office with an x-ray apparatus, will not be considered 'up to date'." So states a prominent medical journal, and

truly, even now in France, England and Germany, such is already the case. The progressive physicians in those countries have taken "time by the forelock", and have not waited to be forced by the educated public into buying the Roentgen ray apparatus. But how about the United States? Pardon. As patriotic Americans we shall not discuss anything calculated to depreciate our idea of our medical world.

"But I don't need it. I made my diagnosis before the x-ray was heard of." That is perfectly true, doctor. But, my dear sir, "seeing is believing." Is there any surer guide to the brachial artery than seeing it spurt?

Doctor, wouldn't it be a source of comfort to know that in the painfully swollen limb of Mr. B., the fractured bones are in perfect apposition? What else could give you this pleasure, besides the x-ray? Your highly developed sense of touch can not do it; the limb is too sensitive for such manipulation. Would it not be balm for your troubled mind to know that a "sprain" is really a sprain and not a fracture? The x-ray will tell you, and you can believe it every time. Candidly now, doctor, wouldn't you be willing to give Mrs. J.—'s child a chance for its life, and operate to remove that safety-pin, if you knew where it was? You can not feel it, nor can you see it unless by the aid of Prof. Roentgen's great invention.

The statement that the Roentgen ray is infinitely valuable to medicine, does not need argument. The physicians of the United States are gradually supplying themselves with such machines, and the time is bound to come, when the Roentgen ray apparatus will be by necessity used by every doctor.

Let us be up-to-date physicians—twentieth century physicians if need be. The time is not far distant when our patients will not be content to believe our unproven statements. The public is

becoming better educated. The days of magic and mystery in medical practice are numbered. Let us take a step forward toward diagnosing our cases with greater certainty before our patients begin to leave us or before the public drives us to use an x-ray machine. Let us welcome the dawn of public enlightenment (and our own) with an x-ray illumination.

EXTRAORDINARY CASE OF STONE-SWALLOWING.

BY CARTER AND GREENWOOD.

The patient was a man aged 24, who passed under the stage name of "The Human Ostrich." He was admitted to Queen's Hospital, September 29, 1897, complaining of severe pains in the abdomen and vertigo. His mother had lived to be 74 years of age, and his father died at 94. Both had earned their living by stone-swallowing. The patient had four brothers and five sisters, alive and healthy, one of the brothers being a professional stone-swallower. The patient himself was accustomed to give a number of performances daily, and at each performance is careful not to take more than about a handful of pebbles. In selecting his stones he avoids all cornered ones, preferring, if possible, to obtain oval smooth stones, averaging in section, about the size of a half-penny. Within 24 hours he is able to take about 8 pounds of stones, and is careful not to go beyond this limit. At each performance he further swallows pieces of brick and glass, both of which he masticates before swallowing. Occasionally he varies his programme by giving exhibitions of watch and sword-swallowing. For the latter trick he uses a straight twenty-four-inch sword; while it is down in the esophagus he fires off a revolver or balances a 28 pound weight on the hilt. Before passing the sword he shifts the larynx bodily to the left

side of his neck, apparently beneath the sterno-mastoid muscle, so that the gullet can be distinctly felt from the front, and leaves a straight course for the sword. In swallowing a watch he selects a lady's watch and pulls it back by means of a string or chain attached to the ring. The stones and other articles which he swallows are passed daily per rectum, and, as a rule, without the least inconvenience. He does not remember when he first learned his performance, having been trained to it from earliest childhood. He states that he once tried to train another person to do the same tricks, but the results were disastrous and soon ended in an operation for intestinal obstruction. He takes an extremely regular and moderate diet, which he never varies: thus, his breakfast consisted of two eggs (swallowed whole, minus the shell), together with "two-pennyworth" of brandy, and a pint and a half of milk. As a rule he takes nothing for dinner, or if he does have anything it is a little porridge, milk-pudding or bread and butter with milk. On examination, the patient was well-developed and healthy in appearance. His tongue was slightly coated. The abdomen was lax; and on succussion, sounds could be distinctly heard, which the patient attributed to the knocking together of the stones inside him; and he was accustomed to demonstrate this to his audience after a performance as a guarantee of good faith. There was marked tenderness with some increased resistance at about McBurney's point. There was nothing abnormal in his heart and lungs.

He remained in hospital for about four days, and then had to leave to look after business matters. While in bed he complained of occasional attacks of severe colicky pain, but in the intervals was quite comfortable. An enema was given with a very good result, and after that he was much easier, and the tenderness

moved from the cecal area to the lower epigastric region. Whilst in hospital he passed no stones in the stools, although he had swallowed a large number on the day previous to his admission. With an idea of testing the Roentgen's rays on the case, a skiagraph was taken, but it was not successful inasmuch as the patient was too nervous to keep still.* It is worthy of note that, despite his extraordinary habits, he enjoyed very good health, stating that he had never previously been ill in his life. Further, that although he took quite sufficient food for a practically sedentary life, it was quite inadequate to allow of any manual work. Thus he stated that if he attempted to work in any form with his hands he was very soon tired and had to give it up.

Dr. Carter's opinion was that at the time of his admission one or more stones had become impacted at the ileo-cecal valve, setting up slight local peritonitis; and that the enema having dislodged the obstruction in that quarter, the onward passage had again been delayed in the transverse colon.—*Birmingham Medical Review*, November, 1897, 300.

TRANSPLANTATION OF BONES FROM A DOG.—In 1891 Dunbar removed five of the small carpal bones from a ten year old girl with tuberculosis of the right wrist, curetting the ends of the bones of the fore arm and metacarpus, and substituting five pieces taken from the lower end of the femur of an eight day-old dog freshly killed. The wound was sutured and drained; it healed rapidly and perfectly. He never expected to see those bones again, but when he met the patient recently he had a radiograph taken of the wrist, which showed the implanted bones, exactly as first placed, connected by new connective tissue, a third larger

*Undoubtedly the best radiographs are obtained when the subject is in a state of complete repose, but it is not absolutely essential for a fair picture. The failure to produce a radiograph of the above was probably due to an inferior generating apparatus. ED.

in size, and grown into the metacarpal. The joint is movable, painless, and no inconvenience is experienced in sewing or knitting. The favorable results secured should encourage others to follow the same plan.—*Bull. de l'Acad. de Med., Deu. Med. Woch.*, December 23.

X-RAYS IN ACCIDENT INSURANCE.—The Roentgen rays promise to be of much help in determining the extent of injuries to policy-holders in accident insurance companies. One dishonest claimant injected irritants in his arm not long ago, and asked the company for a considerable sum for a broken wrist. A surgeon was employed by the company, and although the member was swollen considerably, presenting much the appearance of a fracture, the x-rays showed the bones to be in perfect condition. The patient was naturally chagrined at the discovery, but still thought he was entitled to \$25, which was of course refused.

A still more interesting case was that of a New Orleans man who was thrown from his bicycle, fracturing his forearm. After considerable treatment a physician pronounced the bones united and the patient doing well. The latter, however, thought differently, experiencing sensations in his arm which caused him much pain and uneasiness. The Roentgen rays were resorted to, showing clearly that the bones had never united, and had not even been properly set. A splinter of considerable size was also found to be irritating the skin. The defect was soon remedied, and the period of disability for which the patient could make claim against the company consequently shortened. These cases are thought to have an important bearing upon such matters, since accident companies are constantly having suspicious cases to deal with, in which it has been heretofore almost impossible to determine accurately the justice of the claims made.—*The Electrical Engineer*.

RADIOGRAPHY WITH ITS RECENT APPLICATIONS.

BY PROF. ARTHUR W. GOODSPEED

The first step toward the x-ray tube was made many years ago by Geissler, who produced many curious and beautiful effects by exhausting the air from fantastically shaped glass tubes, and passing a high voltage current of electricity through the rarefied air within. A spark which can travel only nine or ten inches in the air, may in a Geissler tube, pass over a distance of thirty or forty feet. In the Geissler tube only about one-thousandth of the air is allowed to remain. Subsequently Crookes, of England, carried the exhaustion to a much higher degree than Geissler, allowing only about one-millionth of the original quantity of gas to remain in the tubes. On passing an electric discharge, the results were so different from anything ever observed before that Crookes felt compelled to speak of a gas in this state of rarefaction as the "fourth state of matter." It was while experimenting with Crookes' tubes that Roentgen made his wonderful discovery.

The best authorities say that one cubic centimeter of air under standard conditions contains 100,000,000,000,000,000,000,000,000,000 separate molecules flying around with inconceivable velocity in all directions, bumping against their neighbors and the inner surfaces of the containing vessel. By dividing this number by 1,000,000 we find that there are yet remaining in each cubic centimeter 100,000,000,000,000,000 molecules. This then represents the state of things within the tube where the x-rays are generated. Ordinarily the molecule of a gas can move only the smallest fractional part of an inch before striking its fellow molecule, but in the x-ray bulb, the mean free path of the molecule is several inches. When the

discharge is sent through the tube, the molecules are projected with enormous velocity from the negative terminal, or cathode. The cathode is a spherical concave aluminum projector which directs the moving molecules against a small rectangular piece of platinum foil, placed at an angle of 45 degrees, in the centre of the tube. The molecular bombardment heats the platinum foil white hot, and if care is not exercised the foil may be melted, although it has a melting point far above that of most other substances. It is here at the surface of the platinum that the x-rays are produced.

As to the nature of the x-rays, the consensus, at present, of the best opinions is that they are produced by transverse vibrations in the ether similar in nature to ordinary light, but of vibration frequently vastly greater.

According to Sir G. G. Stokes, in a paper read before the Manchester Literary and Philosophical Society last summer, "the Roentgen emanation consists of a vast succession of independent pulses, starting respectively from the points and at the times at which the individual charged molecules projected from the cathode impinge on the target. At first sight, it might appear as if mere pulses would be inadequate to account for the effects produced, seeing that in the case of light we have to deal with series consisting each of a very great number of consecutive undulations. But we must bear in mind how vast, according to our theoretical views, must be the number of molecules contained in the smallest quantity of ponderable matter of which we can take cognizance by our senses. Hence, small as is the quantity of matter projected in a given short time from the cathode, it may yet be sufficient to give rise to pulses, the number of which is inconceivably great."

The lecturer then showed a number of lantern slides illustrating the practical

application of Roentgen ray photography.

Abstract of a paper read before the Electrical Section of the Franklin Institute.

WHAT IS ELECTRICITY? "Amer. Elec., April.—Comments by Steinmetz, Trowbridge, Webster, Macfarlane, Kennelly, Swinton, Reed, Wolcott and Elihu Thomson on the article noticed in the Digest" March 26, the conclusions of which are favorably criticised. Macfarlane states that those who, in attempting to understand electricity seek for an agent or a force, do not understand the modern doctrine of energy. Kennelly believes it quite possible that an electrical charge is an entity in addition to and apart from the electrical energy which accompanies it; a charged insulated metallic sphere may, perhaps, not only be the focus of electrical energy in the surrounding ether, but may be, possibly, the seat of an entity even if this entity be not a substance; if it could be shown that electrostatic flux consisted of a particular kind of stress or displacement in the ether, then the charged sphere would be surrounded by a distribution of this displacement, which might be called electricity, the energy contained in the displacement being electrical energy. Swinton does not despair of the possibility, not only of light without heat, and of the electrical transmission of power on a large scale without wires, but also even of the obtaining of energy by other means than oxidation of carbon; as, for example, directly from the radiations that come to us from the sun or from other sources internal or external to the earth. E. Thomson thinks that if the truth were well known to us, we should find that electrical actions are far more simple than what we regard as purely mechanical ones; he is led, as a matter of philosophy and speculation, to think that if we could see far enough we should find that gravitation, cohesion, inertia and other mechanical forces and

properties, as well as chemical attraction, are in some way dependent upon the electromagnetic properties of ether, and if we really understood the meaning, or could form in our minds an image of electrical actions, we should have the key to nearly all others.

X-RAYS IN DIAGNOSIS OF DISEASES OF THE STOMACH AND INTESTINE. By Drs. J. Boas and M. Levy-Dorn (*Deutsch med. Woch.*, 1898, No. 2.)—The authors found a method of showing, by means of Roentgen rays, the position of the fundus ventriculi, stenosis of the pylorus and probably also stenosis of the lumen of the intestine. By means of this method, the tonus of the muscles of the stomach and intestine can be demonstrated. Gelatine capsules are filled with some mass which is impermeable for x-rays (bismuth); the capsules are coated with some mass which is insoluble in the alimentary tract (celluloid). Capsules thus prepared are swallowed. The fluoroscope gives a dark shade of the capsule, seen as it is descending through the stomach and intestine; even the excursions of the capsule with every inspiration and expiration are observed, as is also the effect of the peristalsis of the stomach. Calculations can be made to establish the anatomical point of the capsule at a given moment: as, for instance, whether it lies in the fundus ventriculi or in the coecum, and how long it remains at each place. The authors are experimenting to find a substance to take the place of celluloid for cases in which it appears desirable to dissolve the capsule at will.—*The Post-Graduate*, N Y.

LUMINESCENCE BY ROENTGEN RAYS. Roiti. *Rendic dei Lincei*, Feb. 20; abstracted with the illustration in the *Lond. Elec.*, April 1.—He investigated the invisible luminescence produced in metals by the impact of Roentgen rays; he calls it crypto luminescence.

PROPERTIES OF X-RAYS.

ROENTGEN.

A long abstract from the reports of the Berlin Academy of Sciences, 1897, being his third contribution; he gives the results of further observations of the properties. If an opaque plate is placed between the tubes and the screen, covering the whole of the latter, some fluorescence will still be seen even when the plate is directly on the screen; he showed that this is due to the fact that the air around the tube gives forth x-rays; if our eyes were sensitive to these rays as they are to light, then such a tube would be like a light in a room filled with smoke. The brightness of a screen illuminated with rapidly intermittent rays depends on a number of properties which he enumerates. The x-rays from a platinum focus plate which are most active for showing images (perhaps he means for photographic purposes) are those which leave the plate at the greatest angle, but not much greater than 80 deg.; thick plates have a relatively larger transparency than thin ones, that is, the specific transparency of a body is greater the thicker the body; when two plates of different bodies are equally transparent they need not necessarily be so when similarly increased in thickness; the relative thickness of two equally transparent plates of different materials is dependent on the material and its thickness, through which the rays have passed before they reach those plates; the same body has different transparencies with different tubes, "soft tubes" being those requiring a small potential and "hard tubes" those requiring a high one; he states that all bodies are more transparent for rays from hard tubes than from soft ones, and in obtaining images this must therefore be considered, the quality of the rays from the same tube depends on: The way in which the interrupter works; the Deprez

form acts more regularly, while the Foucault form utilizes the primary current better; on the spark length in series with the tube; on the insertion of a Tesla transformer; on the vacuum; on other processes in the tube which are not yet fully investigated. A spark gap in series acts like a Tesla transformer, both giving more intense rays which are less easily absorbed; the smallest pressure at which x-rays are produced is very likely below 0.0002 mm. of mercury. The hardening of a tube is not produced only by continuing the exhaustion to soften a hard tube, air may be admitted; it may be warmed, or the current reversed, or very strong discharges sent through it, but the latter generally changes the character of the tube; good results were produced with a tube containing a piece of charcoal of linden wood. The composition of the rays from a platinum anode depends largely on the time element in the current; the quality of the rays does not change with the changes of the primary current, or at least very little, but the intensity is proportional to the strength of the primary current between certain limits. He draws the following conclusions: The radiation consists of a mixture of rays of different intensity and absorbability; the composition depends greatly on the time element in the current; the rays produced by the absorption of bodies are different for different bodies; as x-rays are produced by cathode rays, and as both have common properties, it is probable that both processes are of the same nature. If two screens are illuminated with two tubes, of different hardness, the illumination being made equal, and if then being replaced by photographic plates, the one illuminated by the harder tube will be blackened much less than the other; rays which produce equal fluorescence can be photographically quite different; the usual photographic plates are very transparent for x-rays; in a pile of nine-

ty-six filaments exposed for five minutes the last one showed photographic action. That the eye is not entirely passive to x-rays is shown by an experiment; in looking at a slit in a metal screen with the closed eye covered with a black cloth and by moving the head, a very weakly illuminated slit will be noticed; this may be explained by assuming that fluorescence is produced on the retina.—*Elek. Zeit.*, March 24.

ROENTGEN RAYS IN THE TREATMENT OF LUPUS.—The *Archives d'electricite Medicale, Experimentales et Cliniques* for January, contains an account of two cases which came under the observation of M. Schonberg. The first case was that of a young man who had been perfectly healthy up to the day on which he had been attacked with the disease. This was in January, 1895, and he was treated in the ordinary manner with scraping, iodoform, cauterization, nitric acid, etc. In 1896 the patient was treated with tuberculin in small doses without any appreciable results.

In March, 1896, the Roentgen ray treatment was begun, and carried out in the following manner: The patient was stretched out on a table, and a tin mask was put over the entire portion of the face which was not affected by the disease. A cap of the same metal also covered the head. The tube was placed at a distance of twenty-five centimetres [about a foot] from the face, and the bobbin received a current of twenty volts and five amperes. The duration of the exposure every day was from twenty to thirty minutes. On the 4th day of April, seventeen days after the beginning of the treatment, the exposed surface showed a very distinct reaction and redness, and on the 8th the dermatitis was generalized. From this moment the ulcerated portions yielded gradually and recovery regularly occurred.

In the second case, that of a woman

forty-eight years old, the treatment was carried on in the same manner with equally satisfactory results.

The writer thinks that these two cases are interesting not only because of the results obtained, but also because they demonstrate what a satisfactory therapeutic action the Roentgen rays may produce when they are wisely employed.

TRANSFORMATION OF X-RAYS BY MATERIALS. Sagnac. *L'Eclairage Elec.*, March 12. *The Electrical World*. N. Y.—The beginning of a long article discussing secondary rays, their emission, and the propagation, diffusion and luminous action of x-rays. He had previously shown that a comparison of x-rays with luminous rays does not lead to any positive analogies, but when material intervenes there is a diffusion or dissemination, and he shows that this is a transformation of the x-rays by the material into a species of new rays, which approach the ultra violet rays, and which form a sort of prolongation of the group of known x-rays somewhat as the Hertzian or calorific rays constitute an extension of the luminous spectrum.

VELOCITY OF CATHODE RAYS. Majorana. *Acc. di Lincei*, August; abstracted briefly in the *Lond. Elek. Zeit.*, March 17.—He describes a method which he used to measure the velocity of these rays, and obtained the figure 600,000 metres, although the error is such that it may be 150,000; Thomson, in 1894, gave the figure 190,000; the present author is inclined to believe that the rays vary in their velocities between 100 and 600 km. per second.

MOTOR CARS IN THE ARMY.—It is stated that the Royal Engineer Committee of the War Office has appointed a sub-committee of its members to consider the adaptability of motor cars for purposes of army transport.—*The Electrical Review*, London, March 10, 1898.

FORMS OF ELECTRICAL TREATMENT.

The memorable crusade against electrical quackery some five years ago was immediately followed by a distinct weakening of faith in electrical treatment. Unfortunately, the public memory is a short one, and we have for some time noticed a distinct revival at the hands of quacks of that blessed word, electricity. The claims of the Electrical Hospital of Notting Hill have not, until recently, met with the consideration which they merited; indeed, had it not been for the advertising medium of a coroner and his jury, there is a large probability that the institution would have long remained comparatively unknown. It is unnecessary to detail the whole of the circumstances, but the main facts are that John Salter, an artist, aged 71 years, was found dead at 51 Peel Street, Kensington. The Coroner said "the deceased had received treatment at a so-called 'hospital,' by electricity, but the people being unqualified could not give a certificate, and an inquest was necessary. In some cases electricity was beneficial, but in others might aggravate a disease and accelerate death, which made it a serious matter. He could not understand why people did not go to a proper hospital for treatment." The evidence revealed the hospital to be an institution at Notting Hill, presided over by Prof. D'Odjardi, a name familiar to our readers, who claims to be a medical electrician. Certainly to our own knowledge this gentleman has been associated with medical electricity for a considerable period. It was admitted that the "Professor" had no medical qualifications, but that proved no obstacle to his treatment of consumption, throat affection, blindness, short sight, internal diseases, tumors, influenza, and special treatment of the voice for public speakers, &c. In the case of the poor aged artist he was treated at the Electrical Hospital for

muscular paralysis and numbness of the legs, but according to medical testimony the cause of death was syncope. Apart from the very strong rider of the jury and the Coroner, the evidence given was remarkable, most striking developments in electro-medical treatment having apparently arisen at Notting Hill. Our readers are fairly well acquainted with the action of x-rays, yet, "Prof." D'Odjardi is actually using them in the treatment of disease. The Coroner, in his examination of one of the nurses, asked the following questions:—

Nurses are sent out with apparatus, including that for the x-rays?—Yes, for diseases; they did not take photographs.

With what object?—We use them for the eyesight.

For people who are blind?—Yes.

The "Professor," in his testimony, said he "found x-rays useful in many diseases which caused a weak circulation. It re-animated capillary circulation." The cutaneous troubles arising from the application of x-rays have been commented upon in these columns, and it has been necessary to devise methods to avoid them, yet here is an unqualified man pretending to treat blindness and other complaints by x-rays, with probably disastrous results. The warning of the Coroner came not a moment too soon, and in the interests of genuine electrical treatment it is to be hoped that Mr. D'Odjardi will bear it in mind.—*The Electrical Review*, April 15, 1897, London.

ELMER L. GATES, of Washington, is said to have devised a microscope that is destined to revolutionize microscopy. It is said that its magnifying power exceeds the present microscope as much as the latter exceeds the naked eye; that it has readily magnified 3,000,000 diameters, and by increasing the power of the objectives images will ultimately attain a magnification of 100,000,000 diameters.—*Md. Med. Jour.*

J. J. THOMSON'S THEORY OF ROENTGEN RAYS.

An important contribution to this subject is made by J. J. Thomson. He bases his theory upon known laws concerning the generation of an electro-magnetic field by a moving electrified particle. Such a particle "is surrounded by a magnetic field, the lines of magnetic force being (as in the case of an ordinary current) circles having the line of motion of the particle for axis. If the particle be suddenly stopped, there will, in consequence of electro-magnetic induction, be no instantaneous change in the magnetic field, which for a moment compensates for that destroyed by the stopping of the particle. The new field thus introduced is not, however, in equilibrium, but moves off through the dielectric as an electric pulse." The electrified particle in question is the "cathode ray;" the pulse generated by its sudden stoppage is the Roentgen ray. The author calculates the magnetic force and electric intensity carried by the pulse to any point in the dielectric, and arrives at some most suggestive and, indeed, corroborative conclusions. When the velocity of the particle approaches that of light, two pulses are started when it is stopped. One of these is a thin plane sheet whose thickness is equal to the diameter of the charged particle; this pulse is propagated in a direction in which the particle was moving; there is no corresponding wave propagated backward. The other is a spherical pulse spreading outward in all directions, whose thickness is again equal to the diameter of the charged particle, and thus, if this particle is of molecular dimensions or smaller, its thickness is very small compared with the wavelength of ordinary light. In vacuum tubes, the particles, whatever they are, are stopped by the walls of the tube, possibly after rebounding several times.

The greater their velocity, and the smaller their mass, the more instantaneous will be the stoppage, the thinner and stronger will be the pulse, and the less of it will be absorbed in its passages through substances. The Roentgen rays are therefore not waves, but a rattle of irregular but intense impulses, something like bad musketry.—*Phil. Mag.*, February, 1898.

THE SO-CALLED ROENTGEN LADY.—Latest among the marvels of French origin is *La Femme Roentgen*, a woman who is described as being able to read with ease through opaque bodies. Such, at least, is the story. We are told that Dr. Ferroul of Narbonne has found and has introduced this phenomenal lady to his colleague at the Medical Faculty at Montpellier. "All this is quite impossible," exclaimed Dr. Grasset when he was informed of the new wonder. "Well, you will see," was the reply. Then the demonstration was made. The woman succeeded in reading, at a distance, a letter, the envelope of which had been covered with seals and also posted as an additional precaution, and so Dr. Grasset was converted. Some skepticism on the subject is still permissible, nevertheless; yet what a vista of queer possibilities does not this open out, even if *La Femme Roentgen* possesses only a moderate share of the extraordinary qualities thus attributed to her.—*The Parisian*.

CATHODE RAYS IN AN ALTERNATING FIELD. Ebert. *Wied. Ann.*, No. 2; abstracted briefly in the *Lond. Elec.*, March 18.—He proves that the deflection of the cathode rays by electric oscillations takes place in a well-defined manner when the current producing the cathode rays is quite independent of the deflecting current. It is thought the experiments indicate a valuable and sensitive method of investigating the secondary E. M. F. of open transformers.

FOREIGN BODIES IN THE ESOPHAGUS.

A great variety of foreign bodies have been removed by surgeons from the esophagus and the use of the x-ray in determining their location has proved very valuable and greatly simplifies their removal. Many children have been brought to the clinic who have swallowed pennies, safety-pins or other small objects. Among these was one child three months of age, who had just swallowed an open safety-pin. Examination with the finger revealed the pin with the point turned upwards and imbedded in the wall of the pharynx. The pin was seized with the pharyngeal forceps, and being steadied with the finger, it was turned over without moving the point until its position was reversed, when it could be easily withdrawn. The case is instructive in showing the advisability of making a digital examination in these cases at the very first moment.

Another child, six months of age, was brought who had swallowed a penny, and the esophageal bougie met with some obstruction about the level of the cricoid cartilage. The instrument passed by this obstruction, but on its withdrawal up came the coin along with it, having been dislodged by the bougie.

In two children, four and five years of age, who had swallowed large flat objects, in one case a badge with a pin, and in the other a large brass check, each being circular and about an inch and a quarter in diameter, the skiagraph showed these objects located just below the cricoid cartilage in the esophagus. In one case the foreign body had been impacted for some days, and in the other for three weeks, and it seemed dangerous to attempt their removal with the forceps for fear of extensive laceration of the esophagus or possible hemorrhage from the great vessels. External esophagotomy was therefore performed in both cases and the foreign bodies re-

moved. In one case the edge of the foreign body had ulcerated through the esophagus and lay outside of its walls, in close contact with the carotid artery, and a fatal hemorrhage would probably have occurred before long. Both children recovered.

The operation of external esophagotomy is performed through a three-inch incision at the anterior border of the sterno-mastoid on the left side of the neck, because the esophagus lies slightly to the left of the trachea. When the deep fascia has been divided the sterno-mastoid and the great vessels are drawn to the outer side, while the trachea and larynx are drawn to the inner side. By blunt dissection carefully conducted, the edge of the esophagus is exposed behind the trachea. The great danger of the operation, apart from hemorrhage from the vessels, is injury to the recurrent laryngeal nerve. With a good light the nerve can often be seen in the wound if the latter is kept free from blood.

The esophagus is recognized by its consistency, and the pale color of the muscular fibres, but it can be made prominent in the wound by passing a curved instrument, such as a pharyngeal forceps or a urethral sound, down into it from the mouth. Before the esophagus is opened two stout silk threads should be passed through its walls by curved needles, and the incision made between them. They serve as retractors and do not take up space in the wound. The foreign body is then removed with forceps. If the foreign body should lie in the thoracic portion of the esophagus it might be impossible to remove it, but there is generally very little difficulty when it is within reach of the finger and it can be carefully picked out with the forceps.

The mucous membrane of the esophagus is then sutured with fine silk and the external wound lightly packed,

in the hope of obtaining complete or partial union of the esophageal wound, and so lessening the size of the sinus. When, as in both of the cases just mentioned, the stitches give way, at least the discharge from the esophagus was prevented from reaching the external wound until forty-eight hours after the operation, when the surface was covered by granulations and the danger of infection was much reduced. In a case of esophagotomy recently performed on an infant only three months of age, who had swallowed an open safety-pin, I secured absolute primary union of the esophageal wound by this method of treatment. The external wound should never be sutured, but must be packed with gauze because of the great liability to leakage from the esophagus. It is all-important in these cases that the operation be done early, before ulceration of the esophageal walls and sloughing takes place, because of the danger of septic infection as well as of hemorrhage. The patients are usually poorly nourished, as the swallowing of food is interfered with by the presence of the foreign body, and this is an additional reason for avoiding delay. It is seldom difficult to locate the position of the foreign body with the esophageal bougie, but the x-ray is of great assistance.—*The Post-Graduate*, N. Y., March, 1898.

X-RAYS IN MEDICAL PRACTICE. Williams. “*Medical and Surgical Reports of the Boston City Hospital*,” Jan., 1897; reprint under separate cover.—A long article, accompanied by illustrations and records of a large number of cases. He describes a part of his extended work at the Boston City Hospital; it is chiefly of interest to the medical profession. He found static machines to be the most satisfactory for generators; numerous other results of experience are given, and the various forms of apparatus used are described; the greater portion con-

sists of descriptions and records of cases; the relative advantage of the fluoroscope and radiograph are considered; a number of his conclusions are the same as those in the article above.

DISINFECTION OF BOOKS.—It is gratifying to note that the experiments of Dr. J. S. Billings in relation to the disinfection of library books have demonstrated that the application of formaldehyde to the books, in a proper receptacle, will destroy not only every germ which may have been deposited on the books by persons suffering from infectious or contagious maladies, but also any small insects which may have attacked the leather bindings. This method ought to be applied to all books received in the circulating libraries and similar institutions before the books are allowed to go out a second time.—*Modern Medicine and Bacteriological Review*, Jan., 1898.

The sterilizing effect of the x-rays as reported by Rieder may be effectually employed to disinfect books.

CIRCULATION OF GASEOUS MATTER IN A CROOKES' TUBE. Swinton. *Lond. Elec., Elec. Rev. and Elec. Eng.*, April 1.—An abstract of a Physical Society paper. He investigates the stream lines by the direction and speed of rotation of a mica radiometer mill mounted on a sliding rod so that it could be moved along a line at right angles to that joining the electrodes. A point was reached when the rotation ceased, and beyond this it was reversed. It seems to establish the existence at high degrees of exhaustion, of a true stream which travels from the anode to the cathode quite similar to the cathode stream. At very high vacua, with a large free path, there may be a complete circulation of positive and negative atoms passing from the anode to the cathode and vice versa, delivering up their charges by direct convection. The discussion is given briefly: Appleyard suggested having the veins

of the mill of some light-conducting substance which does not retain the charges, as this would give simpler results.

NATURE OF ROENTGEN RAYS. *Am. Jour. of Sc.*, April.—A brief abstract of an article by Stokes from the *Manchester Memoirs*, 41, Part 4.—He believes that these rays are transverse vibrations of the ether, and that the cathode rays are streams of rapidly moving particles; the apparent transparency of aluminum plates to cathode rays is thought to be the result of a process similar to that which happens to a copper plate immersed in a copper solution which is undergoing electrolysis, and is being dissolved on one side, having copper deposited on it on the other. The deflection of cathode rays by magnetic and electrostatic forces he regards as a greater objection to considering them as light rays. He believes Roentgen rays are impulses and not vibrations. This is followed by a brief abstract of a paper by J. J. Thomson in the *Phil. Mag.* for February, which has already been noticed, and in which he elaborates the impulse theory from the view of the electromagnetic theory of light, concluding that in the x-ray phenomena there are two waves from the electric impulses, one of which is a spherical wave and the other a plain one, the dimensions of the latter being extremely small; x-ray effects are therefore produced at the surface where the electrified moving particles are stopped.

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ROENTGEN RAYS IN THORAX DISEASES. Williams. *Journal of Medical Science*, Dec.—Reprinted in pamphlet form with numerous good illustrations. A long paper, in which he outlines some of the results of the work of the past year (prior to May 5, when the paper was read before the Association of American Physicians), during which time he has examined with x-rays more than 500 patients; he points out the advantages re-

sulting from careful study of radiographs. The paper is chiefly of interest to the medical profession. Some of the results are as follows: No harmful effects were perceived by any of his patients; the varying opacity of all the tissues depends upon the difference in bulk and chemical composition; the difference in permeability of air and water is of great importance in thoracic diseases; the fluoroscope gives a better assurance that the lungs are in a healthy condition than other methods; it gives earlier evidence of lung disease and more accurate information concerning their extent; the heart may be outlined more accurately than has hitherto been possible.

THEORY OF CONNECTION BETWEEN CATHODE AND ROENTGEN RAYS. J. J. THOMSON. *Phil. Mag.*, Feb.—A mathematical article in which he calculates the magnetic force and electrical intensity carried by an electrical pulse to any point in a dielectric, and he concludes from the effects of the sudden stoppage of electrified particles that Roentgen rays are produced by a very thin pulse of intense electro-magnetic disturbance, and that Roentgen rays are not waves of very short wave length, but impulses.

THE RELATION OF HIGH TENSION SPARKS TO X-RAY TUBES.—One of the most difficult points to master in x-ray working is the relation of the spark to the tube. There is almost as much range of variety in sparks as there is variety in the models of tubes, and, amid the confusion, the profession hesitates when the value of these rays as a diagnostic means is of daily demonstration. Early in the spring of 1896, at the meeting of the Michigan State Medical Society at Mount Clemens, I proved, by the use of a static machine, that the true value of the spark in the production of rays was, beyond a certain point (depending on the form of the tube) not in the length of the spark, but in its cali-

bre, and rate of interruption; something that, in all my experiments since, I have not had occasion to change.—J. C. Landon, M. D., in *Leonard's Illustrated Medical Journal*.

RIEDER investigated the effects of the Roentgen-rays upon bacteria from freshly developed cultures and upon colonies growing in cultures. Fresh plate-cultures of the cholera vibrio, the colon-bacillus, the Eberth-bacillus, the diphtheria-bacillus, and others, were partially covered with sheets of lead and the rays directed upon them for from 40 minutes to one hour. In all cases colonies developed in those portions covered by lead, while those portions exposed to the rays remained sterile. When developed colonies of the bacteria were exposed to the rays, these old colonies were not destroyed, but no further colonies developed from them. The growth of tubercle-bacilli was not prevented, but it was much less extensive. This limitation or cessation of growth was not due to the heat of the rays, as but little heat was given out and gelatin was not liquefied; nor was it due to chemic action, as the same bacteria grew well in portions of the culture not exposed to the rays, and other bacteria grew well subsequently in the areas that had been sterilized by the rays. Contaminating cultures did not prevent the growth, as no contamination occurred when the cover was placed in the Petri dish immediately after using the rays.—*The Phil. Medical Journal*. 2-26-'98

CUT FLOWERS, says a prominent London physician, should not be kept longer than a day in the sick room, and it is best to allow only those that are in pots. Artificial flowers must be entirely proscribed; they are very dangerous on account of the dust which always clings to them. Flowers should be chosen with reference to their perfume;

those of a strong odor should never be allowed in the sick room. On the other hand, the presence of flowers should in no wise be forbidden, for manifestly the sight of a violet or a forgetmenot may have a pronounced good effect on the patient, and garlands and green twigs should always be kept in hospitals, especially twigs of eucalyptus, which have disinfectant properties.—*Hospital Life*. 3-'98.

EFFECT OF X-RAYS ON GERMINATION. Maldiney and Thouvenin. *L'Eclairage Elec.*, March 5.—An abstract of an Academy paper, in which they show that x-rays have a beneficial action on the germination of seeds. Three seeds of several plants were subjected to the x-rays for an hour a day, while three others were subjected to exactly the same surroundings, but were screened from the rays; the former, in one case, germinated in three days, while the latter required seven; these were the seeds of the bindweed; others gave similar results; care was taken to maintain the temperature of both sets of seeds alike. He concludes that x-rays hasten the germination at least with the seeds with which he experimented; it appears, however, that the rays had no influence in hastening the formation of the chlorophyl.

ROENTGEN SKIAGRAM IN PERSISTENCE OF DUCTUS BOTALLI.—In a case presented a short time ago at the Berlin Society for Internal Medicine, the diagnosis of a persistent ductus botalli was confirmed by the x-ray picture of the case. Gerhardt has pointed out that there is in such cases an area of dullness, above the base of the heart to the left of the sternum. This is considered to be due to the dilated pulmonary artery. In this case a distinct shadow was found in this situation in the Roentgen skiagram. This, too, is typical of the zeitgeist in Germany, for while scarcely a surgeon

makes a diagnosis of a fracture without a skiagram, no internist concludes definitely as to the presence of an aneurism without the same aid, and even evokes it at times for tubercular infiltration of the lungs and other intra-thoracic conditions.—*The Phil. Medical Journal.*, Mar. 1898.

NEW THEORY OF ELECTRICITY. *GROSS. Electricity*, Feb. 16.—A brief mention of a recent newspaper article in which he claims to have revolutionized the method of producing electricity; he intends to "capture" and utilize the "earth-seeking electricity"; he claims that the earth in revolving generates a powerful current and that his apparatus for generating it will have proportionately greater centrifugal force than that of the earth. He does not pretend to be an electrician.

MM. CH. REMY and G. Contremoulinns have shown before the Paris Academy of Sciences a series of radiographs of a corpse, in which anatomical details it had not hitherto been possible to obtain are observable; in particular, the disposition of the arterial system in its minutest divisions. In one figure, showing the hand, wrist, and part of the arm, the divisions of the arteries and their penetration into the osseous tissue can be traced.—*Journal of Electro Therapeutics*, March, 1898.

X-RAY. *Oliver Annals Oph.*, Oct., 1897.—The author advocates the use of repeated exposures in the use of the Roentgen ray, for the determination of foreign bodies in the orbit. His plan is to take two exposures from different points and deduce the position of the foreign body by geometrical calculation.—*The Post Graduate*, N. Y., April, 1898.

ALTITUDE OF THE AURORA. *Abbe. Terrestrial Mag.*, March.—The beginning of an article in which he collects

some of the numerous observations, calculations and opinions bearing on the nature and altitude of the aurora light.

The Proper Treatment of Headaches.

J. Stewart Norwell, M. B., C. M., B. Sc., House Surgeon in Royal Infirmary, Edinburgh, Scotland, in an original article written especially for *Medical Reprints*, London, England, reports a number of cases of headache successfully treated, and terminates his article in the following language:—

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- (e) It can therefore be safely put into the hands of patients for use without personal supervision.
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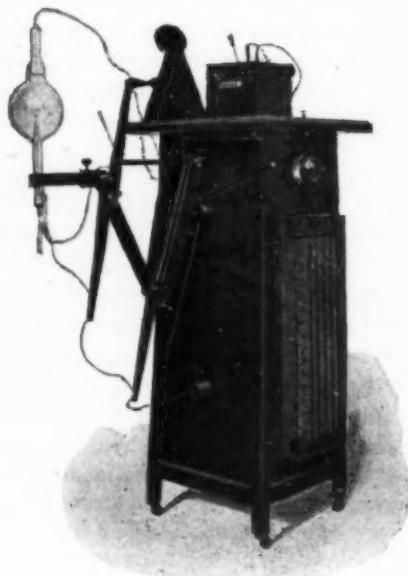
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We therefore heartily recommend this volume to our readers, believing that they will not be disappointed in adding it to their libraries.—*Medical Times and Register*, Phila., Pa., January, 1898.

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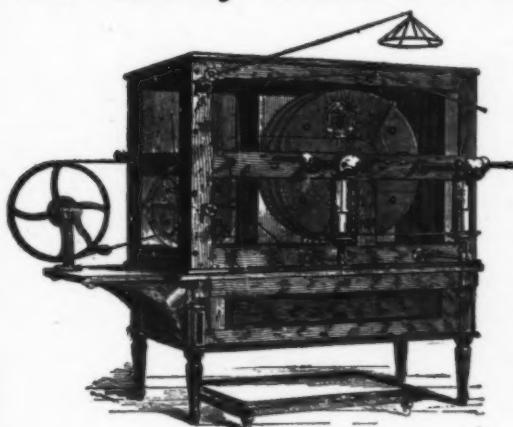
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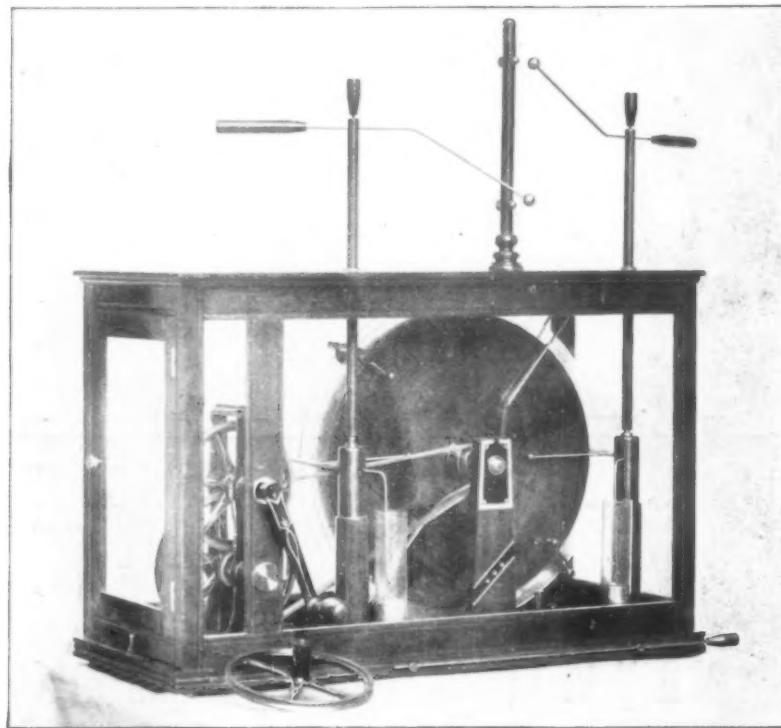
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